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Green Facts

The protection of water quality in bored and dug wells.

The purpose of this Green Facts sheet is to assist people who rely on bored and dug wells for their water to achieve acceptable water quality. Improper well construction or a failure to carry out routine preventive maintenance on wells can result in contaminated water. In 2003, Ontario updated its regulatory requirements for water well siting, construction, maintenance and abandonment to better protect well users and groundwater resources.

Ontario's Well Regulation (Reg. 903, under the Ontario Water Resources Act) provides for the licensing of well contractors and well technicians by the Ministry of the Environment. The regulation also sets out minimum construction standards to which all contractors, including private homeowners, must adhere. Although upgrading work can be done by a private well owner working on their own property, employing a licenced well contractor is strongly advised to ensure that proper minimum well construction standards are met and protection of the water supply is achieved.

The regulation also states that "the well owner shall maintain the well at all times after the completion date in a manner sufficient to prevent the entry into the well of surface water or other foreign materials."

Because some bored and dug wells are constructed using different types of equipment and are particularly susceptible to deterioration of their sanitary integrity, maintenance on these types of wells is especially important.

Factors contributing to the deterioration of dug well water quality

A poorly constructed or maintained well can result in the bacterial and/or chemical contamination of well water. The most common cause of these quality problems is foreign materials or poor-quality surface waters in the immediate vicinity of a well having direct access into the well.
In Ontario, bored wells are usually constructed by a bucket or auger-type rotary machine, whose boring operations produce holes of 76 centimetres or more in diameter. Bored wells are usually cased or lined with concrete having an inside diameter of 60 centimetres or more. Large diameter wells can also be constructed with other types of equipment, such as backhoes. The well casing can consist of steel, galvanized steel casing or fibre-reinforced plastic.

All joints around the casing or liner of a bored or dug well must be sealed using materials prescribed in the regulation to ensure maximum protection of the water supply.
Indicators that the well sealing may be inadequate and that surface contamination may be gaining access to the well include:

- the presence of coliform bacteria in counts exceeding recommended limits set by health authorities;
- changes in the quality of the water such as turbidity, colour, taste or odour, especially after a rainstorm or snow melt;
- rapid or large changes in the water level in the well, especially after a rainstorm or snow melt;
- cascading or seeping of water and/or staining along the inside of the casing above the water level in the well;
- the presence of biological material such as animals, insects or roots in the well;
- the presence of unsealed or parted joints or cracks in the well casing wall or cover;
- the settlement of the ground surface around the top of the well;
- the presence of roof drainage pipes into the top of the well;
- the absence of a watertight well cover set at an appropriate height above the ground surface; or
- changes in the chemical quality of the well water as detected through laboratory analysis.

Preventive maintenance measures

Well owners need to know the measures that should be taken for the care and maintenance of a well to ensure it provides good quality water. The following is key.

Protect against contaminants

To safeguard a well supply from contamination, do not do anything near the well that might result in contamination. Do not store, use or dispose of refuse, manure, petroleum products, salt, fertilizers, pesticides, paints or any other potential contaminants in the vicinity of the well. When mixing pesticides or paints, the water supply line from the pressure system should be equipped with a backflow prevention device to prevent chemicals from flowing backwards down into the well.

Do not try to conceal the well with flower boxes, a garden or trees or place bird feeders nearby.

Watch for signs of damage

The well casing must be securely in place and watertight. If damaged or cracked, it must be replaced immediately since it will give contaminants direct access to the well. The well casing cap should be a minimum of 40 centimetres above ground surface.

No unsealed openings should exist in the wall or along the joints of cement-tile casing from the well cap to a depth of six metres for new well construction. If any unsealed openings are found, they should be made watertight with an appropriate durable sealing material. Applying this from the outside of the casing is preferable. Corrosion or other damage can occur and will allow surface waters or shallow seepage waters to enter directly into the well.

The space outside the outer casing must be filled with a suitable sealant, such as a bentonite or an equivalent commercial slurry, to prevent surface water runoff from seeping directly into the well around the casing. Call a licensed well contractor with employees holding valid well technician licences (Class 2) if settlement of the sealant has occurred.

If the land surface around the well is depressed or susceptible to flooding, it should be raised and regraded so that it slopes away from the well, with the well casing also being raised if necessary.

If the land surface has been regraded, or if the casing has settled, check to see if the well casing extends 40 centimetres above the highest point within a three-metre radius of the well. If not, extend the casing to the required height and ensure the ground still slopes away from the well.

The well water's surface should be inspected, and any debris found floating in the surface of the water removed from the well. Under no circumstances should a well owner enter a well.

The connections through the well casing for pump and electrical lines must be made watertight and properly sealed. If the seal has failed, the material outside the casing may have to be excavated, a new seal installed, and the material carefully replaced.

All wells that have been repaired should be chlorinated. It is strongly recommended that the well water is tested for potability immediately after the work has been completed. Proper evacuation of the chlorinated water out of the well must be conducted before the well water is consumed or used.

Do not tamper with or remove any well tags.

All abandoned wells must be plugged and sealed in accordance with the Wells Regulation.

Additional information sources

You can obtain a copy of Regulation 903 from the e-Laws web site at www.e-laws.gov.on.ca or by calling Publications Ontario at 1-800-668-9938. The following information sheets are available from the Ministry of the Environment's web site or by calling its Public Information Centre:

- The protection of water quality in drilled wells
- The protection of water quality in jetted or driven point wells
- Important facts about water well construction

For further information about wells contact your nearest Ministry of the Environment office listed in the blue pages of your telephone directory. You can also call the ministry's Public Information Centre at 1-800-565-4923 or (416) 325-4000. The ministry's Web site is at www.ene.gov.on.ca.